DOCUMENT RESUME

ED 427 589 HE 031 780

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TITLE Collaborative Learning: Preferences, Gains in Cognitive & Affective Outcomes, and Openness to Diversity among College Students. ASHE Annual Meeting Paper.

PUB DATE 1998-11-00

NOTE 28p.; Paper presented at the Annual Meeting of the Association for the Study of Higher Education (23rd, Miami, FL, November 5-8, 1998).

PUB TYPE Reports - Research (143) -- Speeches/Meeting Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.

DESCRIPTORS Cognitive Development; *Cooperative Learning; *Diversity (Student); Emotional Development; Higher Education; Instructional Effectiveness; *Outcomes of Education; Peer Relationship; Racial Attitudes; *Student Development; Teaching Methods

IDENTIFIERS *ASHE Annual Meeting; *National Study of Student Learning

ABSTRACT

This study examined possible solutions to the paradox faced by college administrators as they try to increase diversity in the student body while minimizing tensions. The study used 1994 data on 2,050 second-year college students from the National Study of Student Learning, a longitudinal investigation of factors influencing student learning and development. Five dependent variables were considered: personal development, appreciation for fine arts, analytical skills, understanding science and technology, and openness to diversity. Seven independent variables were examined: gender, ethnicity, parental education, precollege ability, racial composition of high school, effort (hours spent studying), experience with collaborative learning, preference toward collaborative learning, and second-year gains. Collaborative learning was found to predict gains in cognitive level, affective level, and openness to diversity across all student populations. Results suggest that cooperative learning practices can create the process and setting whereby learning is maximized, and preconceptions are confronted through positive, productive interactions among students of different backgrounds. (Contains 43 references.) (DB)

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Collaborative Learning: Preferences, Gains in Cognitive & Affective Outcomes, and Openness To Diversity among College Students

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HE 031 780

Paper presented before the 1998 Annual Meeting of the Association for the Study of Higher Education. Miami, Florida.

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This paper was presented at the annual meeting of the Association for the Study of Higher Education held in Miami, Florida, November 5-8, 1998. This paper was reviewed by ASHE and was judged to be of high quality and of interest to others concerned with higher education. It has therefore been selected to be included in the ERIC collection of ASHE conference papers.

Collaborative Learning: Preferences, Gains in Cognitive and Affective Outcomes, and Openness to Diversity among College Students.

Abstract

Recognizing the importance of openness to diversity, several institutional strategies have been enacted, primarily either by focusing on the inclusion of multicultural education, or by increasing the numerical diversity, hoping that student intercultural contact would evolve naturally. Instead, racial tensions magnify when the proportion of minorities increases (Blalock, 1967; Blumer, 1958; Smith, 1981). Just throwing people together lacks a process by which the attitudes and beliefs of culturally different subgroups are challenged. So, the basic paradox college administrators face is how to increase diversity in the student body while minimizing tensions. Based on a sample of 2,050 second-year college students enrolled at 23 institutions in the Spring of 1994, results point to collaborative learning settings on campus as one solution to this paradox. Collaborative learning was found to predict gains in cognitive level, affective level and openness to diversity across all student populations. The authors suggest cooperative learning practices can create the process and setting where learning is maximized while preconceptions are confronted through positive, productive interactions between students of different backgrounds.

Collaborative Learning: Preferences, Gains in Cognitive & Affective Outcomes, and Openness To Diversity among College Students

The vitality of the classroom experience has regained recognition as one of the most important factors influencing college students' cognitive, motivational and affective development. Classroom experiences have been found to exert positive effects on a diverse array of student outcomes. These include academic and cognitive development, knowledge acquisition, clarity in educational goals, interpersonal skills, and the quality of student effort spent in academic activities (e.g. Astin, 1987; Pascarella & Terenzini, 1991; Tinto, 1997; Volkwein, 1991; Volkwein, King &Terenzini, 1986; Volkwein & Cabrera, 1997, 1998).

In view of the centrality of classroom experiences in student development, it is not surprising that concomitant attention has been devoted to those forces shaping the classroom experience itself. Accordingly, the curriculum (Stark & Latucca, 1997), frequency and nature of interactions with faculty in the classroom (Pascarella & Terenzini, 1991), student learning styles (Claxton & Murell, 1987), racial climate (Hurtado, 1992; Cabrera & Nora, 1994), and the character of teaching practices (Murray, 1991) have received increasing recognition as important predictors of classroom experiences. Among the many teaching practices, collaborative learning has been singled out as the most promising. In his recent review of the Student Integration Model, Tinto (1997), for instance, placed collaborative learning at the core of the academic and social experiences of the student, while highlighting its role on the quality of effort the student spends in learning. As acknowledged by Tinto (1997), collaborative learning, however promising, has not been subjected to empirical investigations that examine the relationships to specific college-related outcomes.

The study examined three propositions regarding the role collaborative learning plays in student development and learning. These propositions center around: a) preferences among different gender and ethnic groups towards collaborative learning, b) effects of collaborative learning on perceived cognitive and affective gains for White males, White females and minorities, and d) the potential role collaborative learning may have in increasing tolerance and openness towards diversity.

Literature review

Collaborative learning, extensively used and researched in the K-12 arena (Slavin, 1990), emerged as an important pedagogy in higher education during the late 1980s (Bruffee, 1993; Goodsell, Maher, & Tinto, 1992). Collaborative learning restructures the classroom away from the traditional lecture to small group work requiring intensive interactions between students and the faculty member while working through complex projects. Through completion of projects, learning is supposed to be enhanced as students build upon their personal experiences while working with other students. In this context, the role of faculty is as facilitator rather than as a knowledge source (Bruffee, 1993; Johnson, Johnson, & Smith, 1992; Slavin, Karweit, & Madden, 1989).

The literature mirrors two approaches regarding the value of collaborative learning for student development. One approach regards collaborative learning techniques as having universal value for all students (e.g. Johnson, Johnson & Smith, 1991; Tinto, 1997). The second approach emphasizes differences in learning styles between White women and minorities, on the one hand, and White males on the other (e.g. Belenky, Clinchy & Goldberger, 1986; Lundeburg & Diemert, 1995; Baxter-Magolda, 1992; Martínez-Alemán, 1997).

Advocates of the universal approach to collaborative learning call attention to the link between this instructional technique and different student outcomes. Some evidence seems to support this position. Kulik and Kulik's (1979) extensive review of the literature, for instance, found class discussions, an ingrained component of collaborative learning, leading to higher cognitive development and long-term knowledge retention as compared to traditional pedagogy. Johnson, Johnson and Smith's (1991) meta-analysis of studies among college students found positive correlations between cooperative learning and achievement, personal development (interpersonal attraction and self-esteem), and social support. However, several limitations exist within the current literature preventing us from reaching firm conclusions regarding the effect of collaborative learning among college students. To begin, most of the literature is based at the elementary and secondary school levels (e.g. Slavin, 1992). Those few studies that empirically examine collaborative learning in the higher education setting are dated and single program/institution-based. Furthermore, with the exception of Tinto's (1997) recent longitudinal study, most studies are correlational and cross sectional in nature. This type of research design prevents us from teasing out the effect of collaborative learning from other factors (e.g. academic ability, quality of academic effort) that are also related to student learning and cognitive development.

Proponents of the view of the differential effect of collaborative learning base their arguments on the theory that White women and minorities learn differently than do White men (Belenky, Clinchy, Goldberger & Tarule, 1986; Anderson & Adams, 1992). The basic argument is that both White women and minorities' learning styles emphasize connected knowing, cooperative problem solving, and socially-based knowledge. Consequently, White women and

minorities prefer collaborative learning settings because this pedagogy matches their learning styles. On the other hand, White men prefer traditional pedagogy given their more analytical, individualistic, and competitive learning styles. Research evidence has been mixed. Lundeburg and Moch's (1995) qualitative study of women attending a private, single-sex Midwestern college found that women preferred collaborative learning. Lundeburg and Moch also observed that the collaborative nature of the student interactions promoted intellectual risk-taking and connected understanding of concepts. Levin and Levin's (1991) comprehensive review of programs for college students at risk found that minorities were remediated best in collaborative learning settings. Treisman and Fullilove (1990) reported that African American students enrolled in collaborative learning courses had higher GPA's, higher retention rates, and were more likely to major in math-based majors than their African American counterparts enrolled in traditional courses. On the other hand, Tinto (1997) found that collaborative learning was effective in promoting persistence in college, regardless of a student's gender or race/ethnicity.

In addition to its potential connection with student cognitive and affective development, Vogt (1997) has persuasively argued that cooperative learning may be an important force to promote tolerance among college students. At the core of Vogt's argument lies Allport's (1954) five principles for a successful contact situation among people from different ethnic backgrounds. Cooperative learning meets some of these conditions: a) individuals collaborate rather than compete, b) equal status among participants is promoted, and d) the focus of the group effort is directed at solving projects. Albeit promising, the connection between collaborative learning and tolerance among college students has not been empirically examined. However, the scarce research suggests some students' personal characteristics (e.g. precollege

academic ability, number of hours per week spent studying) and some classroom-based activities (e.g. participation in class discussions) foster openness towards diversity (Pascarella, Edison, Nora, Hagedorn & Terenzini, 1996). We also know that certain classroom practices can be perceived by the students as discriminatory and prejudiced. Cabrera and Nora (1994), for instance, found that minority students who felt singled out and treated differently in the classroom reported high levels of alienation and isolation from the institution.

Methodology

Sample. The sample is comprised of 2,050 second-year college students enrolled at 23 institutions in the Spring of 1994. This sample was drawn from the incoming freshman class of 1992 who participated in the National Study of Student Learning (NSSL), an extensive, longitudinal investigation of the factors influencing learning and development in college. The sample is predominately female (64.5%) and Caucasian (62.2%). Most students reported that their parents had some college education. These students attended high schools whose racial composition was predominately White. In terms of quality of academic effort (Astin, 1984), the average student spent between 11-15 hours per week studying (see Table 1).

Measures. Five dependent variables were considered. Perceived gains in learning-related and cognitive skills were assessed via scales developed by Pace (1979): a) Personal Development (α=.81), b) Appreciation for Fine Arts (α=.73), c) Analytical Skills (α =.80), and d) Understanding Science & Technology (α=.90). These scales were highly reliable (with alpha reliabilities ranging from .73 to .90), and have been found to be predictive of college persistence (see Nora, Cabrera, Hagedorn & Pascarella, 1996). The fifth dependent variable, Openness to Diversity, was measured with a 7-item scale assessing students' attitudes and predispositions towards interacting with people from different ethnic backgrounds. The scale is reliable (α=.85),

and information about its construct validity can be found in Pascarellla, et. al (1996).

Seven independent variables were examined. Preference for collaborative learning was measured via a four-item scale, tapping preferences towards learning in groups inside and outside the classroom[1]. The reliability of this scale was high (α=.85). Cooperative learning practices were assessed via a five-item scale asking the frequency with which the student was engaged in group projects, class discussions and study groups[1]. The reliability of the scale was also high (α=.78). Additional measures included indicators of socioeconomic status (parental education), precollege ability (CAAP scores), precollege academic performance (High School GPA), and quality of academic effort (average hours per week spent studying). The selection of these additional independent variables was guided by the extant literature (Astin, 1993; Cabrera & Nora, 1994; Pascarella et. al, 1996; Nora et. al, 1996; Tinto, 1997; Vogt, 1997), and were included in the regression analyses to control for relevant sources of variance. A measure of the racial composition of the student's high school was also included given school desegregation literature finding desegregated K-12 schools attendees are more tolerant towards ethnic diversity (Braddock, 1980).

Table 1 displays descriptive statistics and reliabilities for the variables and scales used in the study.

Insert Table 1

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[1]Item composition and corresponding factor loading are provided in Appendix A.

Results

Preferences & learning styles. Differences in preferences for collaborative learning experiences are presented in Table 2. Mixed support was found for the proposition regarding preferences towards collaborative learning. Among minorities, women were as predisposed towards collaborative learning as were men (t=-.17, p=.865). Likewise, no significant differences were noted between White females and White males (t=1.18, p =.402). Both groups were just as likely to prefer collaborative learning. However, minorities, regardless of their gender, were more predisposed towards collaborative learning than were Whites. While significant, however, the magnitude of the mean differences between minorities and White male and female students was rather small, less than one point out of a 5-point scale.

Insert Table 2

Cooperative learning practices & student outcomes. Table 3 summarizes the regression results seeking to test the effect of cooperative learning practices on cognitive and affective outcomes on all students. All regressions were significant at .01. The model explained 10.3%, 9.7%, 6.6% and 13.2% in gains related to personal development, understanding science and technology, appreciation for art and analytical skills, respectively. In relation to all factors under consideration, collaborative learning was the single best predictor for each of the four cognitive and affective outcomes under consideration.

Insert Table 3

Learning styles hypothesis.. Twelve regression analyses were conducted to test the differential learning style hypothesis. The groups under consideration were: White males (469), White females (805) and Hispanic and African Americans (518). The small number of male minorities (148) prevented us from breaking down analyzes by gender among minorities. On the other hand, treating women and men as a group was supported by two findings. No significant differences in preferences towards cooperative learning between males and females were noted (see Table 2), and a series of regression analyses controlling for gender found no significant gender effect among minorities in each of the four cognitive and affective outcomes. Table 4 presents the regression results across ethnic and gender groups.

Insert Table 4

All twelve regressions were significant at .01. The model explained as little as 4.5 % and as much as 14.5% of the variance observed in the cognitive and affective outcomes. No support for the differential learning style hypothesis was found. Collaborative learning was the most significant predictor for each of the four self-reported gains under consideration and across each of the three groups under consideration. While the magnitude of the effect of collaborative learning did vary across the three groups in each outcome, the pattern of effects was consistent in each of the three groups.

Openness to diversity. The model was significant at .01 and explained 9.4 % of the variance observed in openness to diversity . After controlling for precollege academic ability, gender, ethnicity, quality of academic effort, socioeconomic status, and racial composition of the high school, collaborative learning exerted the highest effect on a college student's openness

towards diversity. Net of precollege ability, performance and academic effort, results also show that women and Hispanic students were more predisposed to tolerance of others at the end of the second year than were White males (see Table 5).

Insert Table 5

Discussion

Collectively, the findings make a compelling case for using cooperative learning practices. These techniques harness the ability and motivation of the student towards her personal development, understanding of science and technology, appreciation for art, analytical skills gain, and openness to diversity. Across these five cognitive and affective outcomes, cooperative learning practices had the highest effect, well beyond those attributable to precollege academic ability, gender, ethnicity, parental education, and academic effort. Hence, collaborative learning is a direct tool institutions can implement to bring about critical student development outcomes.

The teaching and learning literature has lauded the benefits of collaborative learning; however, the extent and specificity of its benefits remains at issue. One strand argues for the universal benefits of cooperative learning practices (Tinto, 1997; Johnson, Johnson, Smith, 1991; Goodsell, et al., 1992), while another suggests such practices more closely match women and minority learning styles and preferences, consequently maximizing their learning and development (Belenky, Clinchy, Goldberger, & Tarule, 1985, 1986; Aleman, 1997; Baxter-Magolda, 1992; Lundeberg & Diemert, 1995). Our results concur with the universal approach.

Not only do White women and minorities prefer collaborative learning settings, so do their White male counterparts. Furthermore, not only are White women's and minorities' cognitive and affective development fostered within these settings, so are their White male counterparts'.

Chickering and Reisser (1993) consider developing mature interpersonal relationships as a key vector of student development. This vector "require[s] the ability to accept individuals for who they are, to appreciate and respect differences" (p. 146). Kuh, Douglas,Lund, and Ramin-Gyurnek (1994) regard openness to diversity as a component of cognitive complexity, a skill that "enable[s] a college-educated person to think critically and to evaluate logically" (p. 25). Furthermore, as we prepare students to enter an increasingly global and diverse society, all sectors of the labor market are demanding graduates whose modes of thinking and relating transcend ethnocentricism (Pucik, Tichy, Barnett, 1993). Acknowledging the need for tolerant graduates, accreditation bodies have increased the pressure on institutions of higher education to proactively foster "expand[ed] cultural awareness" (MSACC, 1996) among students and produce graduates who can "function on multidisciplinary teams" (ABET, 1998).

Recognizing the importance of openness to diversity, several institutional strategies have been enacted, primarily focusing on content or structures. Content strategies stress the inclusion of multicultural education, either through general education requirements or specific course materials (Banks, 1993). Others have resorted to increasing the numerical diversity, hoping that student intercultural contact would evolve naturally (Hurtado, Milem, Clayton-Pedersen, & Allen, 1998). Instead, racial tensions magnify when the proportion of minorities increases (Blalock, 1967; Blumer, 1958; Smith, 1981). So, the basic paradox college administrators face is how to increase diversity in the student body while minimizing tensions. Our results point to

collaborative learning settings on campus as one solution to this paradox. Just throwing people together lacks a process by which the attitudes and beliefs of culturally different subgroups are challenged. Cooperative learning practices create the process and setting where learning is maximized while preconceptions are confronted through positive, productive interactions between students of different backgrounds.

References

Accreditation Board for Engineering and Technology (1998). *Engineering criteria 2,000.* Maryland: ABET.

Allport, G. W. (1954). *The nature of prejudice*. Reading, MA.: Addison-Wesley.

Anderson, J. A. & Adams, M. (1992). Acknowledging the learning styles of diverse student populations: Implications for instructional design. *New Directions for Teaching and Learning*, 49, 19-33.

Astin (1984). Student involvement: A developmental theory for higher education. *Journal of College Student Personnel*. 22. 297-308.

Astin, A. W. (1993). *What matters in college? Four critical years revisited.* San Francisco: Jossey-Bass.

Banks, J.A. (1993). The canon debate, knowledge construction, and multicultural education. *Educational Researcher, 22(5)*, 4-14.

Baxter-Magolda, M. D. (1992). *Knowing and reasoning in college: Gender-related patterns in students' intellectual development*. San Francisco: Jossey-Bass.

Belenky, M.F., Clinchy, B.M., Goldberger, N. & Tarule, J. M. (1986). *Women's ways of knowing: The development of self, voice, and mind.* New York: Basic Books.

Belenky, M. F., McVicker, B C., Goldberger, N. & Tarule, J. M. (1985). Epistemological development and the politics of talk in family life. *Journal of Education, 167*(3), 9-27.

Blalock, H. M. (1967). *Toward a theory of minority-group relations*. New York: John Wiley.

Blumer, H,. (1958). *Race prejudice as a sense of group position*. Pacific Sociological Review, 1, 3-7.

Braddock, J. H. (1980). The perpetuation of segregation across levels of education: A behavioral assessment of the contact hypothesis. *Sociology of Education*, 53, 178-186.

Bruffee, K. (1993). *Collaborative learning: Higher Education, interdependence, and the authority of knowledge*. Baltimore: The Johns Hopkins University Press.

Cabrera, A. F. & Nora, A. (1994). College students' perceptions of prejudice and discrimination and their feelings of alienation: A construct validation approach. *Review of Education/Pedagogy/Cultural Studies, 16*(3-4), 387-409.

Chickering, A. W. & Reisser, L. (1993). *Education and identity*. San Francisco: Jossey-Bass.

Claxton, C. S. & Murrell, P.H. (1987). *Learning styles: Implications for improving educational practices*. ASHE-ERIC Higher Education Report No. 4. Washington, DC.: Association for the Study of Higher Education.

Goodsell, A., Maher, M. & Tinto, V. (1992). *Collaborative learning: A sourcebook for Higher Education*. National Center on Postsecondary Teaching, Learning & Assessment. Syracuse University.

Hurtado, S. (1992). The campus racial climate: Contexts of conflict. *Journal of Higher Education*, 63, 539-569.

Hurtado, S., Milem, J.F., Clayton-Pedersen, A.R. & Allen, W. R. (1998). Enhancing campus climates for racial/ethnic diversity: Educational policy and practice. *Review of Higher Education*, 21(3), 279-302.

Johnson, D. W., Johnson, R. T., & Smith, K.A. (1991). *Cooperative learning: Increasing college faculty instructional productivity*. ASHE-ERIC Higher Education Report No 4. Washington D. C.: The George Washington University, School of Education and Human Development.

Kuh, G.D., Douglas, K.B., Lund, J. P. & Ramin-Gyurnek, J. (1994). *Student Learning Outside theClassroom: Transcending Artificial Boundaries*. Washington, DC: ASHE-ERIC Education Report No. 8.

Kulik, J. & Kulik, C. L. (1979). College teaching. In P. Peterson & H. Walberg, (Eds.) *Research on teaching: Concepts, findings and implications*, pp. 70-93. Berkeley, CA: McCutcheon.

Levine, M. E. and Levine, R. L. (1991). A critical examination of academic retention programs for at-risk minority college students. *Journal of College Student Development*, 32, 323-334.

Lundeberg, M. A. & Diemert, S. (1995). Influence of social interaction on cognition: Connected learning in science. *Journal of Higher Education*, 66(3), 312-335.

Martínez-Alemán, A. (1997). Understanding and investigating female friendship's educative value. *Journal of Higher Education*, 68(2), 119-159.

Middle States Association of Colleges and Universities (1990). *Framework for outcomes assessment*. Philadelphia: Commission on Higher Education.

Murray, H. G. (1991). Effective teaching behaviors in the college classroom. In J.C. Smart (Ed.) *Higher education: Handbook of theory and research, Vol. VII* (pp. 135-172). New York: Agathon Press.

Nora, A., Cabrera, A. F., Hagedorn, L. S. and Pascarella, E. (1996). Differential impact of academic and social experiences on college-related behavioral outcomes across different ethnic and gender groups at four-year institutions. *Research in Higher Education, 37*(4), 427-452.

Pace, C. R. (1984). *Measuring the quality of college student experiences.* Los Angeles: UCLA.

Pascarella, E. T., Edison, M., Nora, A., Hagedorn, L. S., Terenzini, P. T. (1996). Influences on students' openness to diversity and challenges in the first year of college. *Journal of Higher Education*, 67(2), 178-195.

Pascarella, E. & Terenzini, P. T. (1991). *How college affects students.* San Francisco: Jossey-Bass.

Pucik, V. , Tichy, N. M., & Barnett, C. K. (1992). *Globalizing management: Creating and leading the competitive organization.* New York: John Wiley & Sons, Inc.

Slavin R. E. (1990). *Cooperative learning: Theory, research. and practice.* Englewood Cliffs, NJ: Prentice-Hall.

Slavin, R. E., Karweit, N. L. & Madden, N. A. (1989). *Effective programs for students at risk. Boston*: Allyn & Bacon.

Smith, A. W. (1981). Racial tolerance as a function of group position. *American Sociological Review*, 46, 558-573.

Stark, J. S. & Latucca, L. R. (1997).*Shaping the college curriculum: Academic plans in action.* MA.: Allyn & Bacon.

Tinto, V. (1997). Classrooms as communities: Exploring the educational character of student persistence. *Journal of Higher Education*, 68(6), 599-623.

Treisman, & Fullilove (1990). Mathematics achievement among African American undergraduates at the University of California, Berkeley: An evaluation of the mathematics workshop program. *Journal of Negro Education*, 59, 463-478.

Vogt. P. V. (1997). *Tolerance and education: Learning to live with diversity and difference.* London: Sage

Volkwein, J.F., King, M. & Terenzini, P.T. (1986). Student-Faculty relationships and intellectual growth among transfer students. *Journal of Higher Education*, 57(4), 413-430.

Volkwein, J. F. & Lorang, W. (1996). Characteristics of extenders: Full-time students who take light credit loads and graduate in more than four years. *Research in higher education, 37* (1).

Volkwein, J. F. & Cabrera, A.F. (1998). *Student measures associated with favorable classroom experiences*. Paper presented at the Association of Institutional Researchers Forum. Minneapolis: MN.

Volkwein, J. F. (1991). *Improved measures of academic and social integration and their association with measures of student growth*. Paper presented at the annual meeting of the Association for the Study of Higher Education, Boston, MA, November, 1991.

Appendix A

A. Cooperative learning

Item	*Factor Loading*
I am often required to work cooperatively with other students on course assignments	.768
Instructors encourage learning in student groups	.745
In my classes, students teach each other in groups instead of only having instructors teach classes	.851
Instructors encourage learning in student groups	.784
Instructors engage me in classroom discussion or debate of course ideas and concepts	.482
Cronbach's Alpha Reliability	.778

B. Preferences towards collaborative learning

Item	*Factor Loading*
I feel that I learn better when students teach each other rather than having instructors teach in class	.790
I prefer learning in groups with other students to learning from lectures	.866
I learn best when I am required to work cooperatively with other students on course assignments	.853
I learn a great deal when I participate in study groups outside of class	.800
Cronbach's Alpha Reliability	.847

Table 1. Descriptive statistics

Variable	*N*	% *Cell*	*Mean*	*S.D.*	*Reliabilty*
Gender					
Male	779	35.3			
Female	1,424	64.5			
Ethnicity					
African-American	331	16.1			
Asian-American	173	8.4			
Hispanic	272	13.3			
White	1,274	62.2			
Parental Education					
Mother's			5.02	2.04	
Father's			5.30	2.30	
Pre-College Ability					
CAAP Scores			185.26	13.53	
HS GPA			4.70	1.16	
Racial Composition of HS			3.64	1.20	
Effort					
Hours spent studying per week			3.94	1.34	
Collaborative Learning			2.32	.57	.78
Preference towards Collaborative Learning			3.45	.86	.85
Second Year Gains in:					
Personal Development			2.77	.63	.81
Understanding Science & Tech.			2.18	.89	.73
Appreciation for Art			2.31	.69	.80
Analytical Skills			2.83	.66	.90
Openness to Diversity			3.82	.65	.85

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Table 2. Differences in preferences towards collaborative learning (t-tests).

Group	1	2	3	4	Mean	SD
White/Female (1)	-				3.34	.88
White/Male (2)	1.18	-			3.41	.81
Minority/Female (3)	3.87**	2.63**	-		3.59	.85
Minority/Male (4)	3.08**	2.21*	.17	-	3.61	.79

p < .05; **p < .01

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Table 3. Regression Results for All Students (Standardized Betas)

	Cognitive & Affective Outcomes			
Variable	***Personal Development***	***Understanding Science & Technology***	***Appreciation for Art***	***Analytical Skills***
Precollege Academic Ability				
CAAP scores	-.088**	-.003	.009	.008
High School GPA	.065*	.112**	-.009	.094**
Gender (Female)	-.117**	.136**	-.019	-.033
Parental Education				
Mother's education	.011	.004	.012	-.006
Father's education	.075*	.014	.054	.040
Racial Composition of HSchool	.031	.035	-.020	-.011
Ethnicity				
African-American	-.075**	.081**	-.017	.004
Asian	-.018	.077**	-.008	-.025
Hispanic	.028	.068*	.015	-.006
Effort				
Hours spent studying	.033	.132**	.035	.116**
Cooperative Learning Practices	.256**	.215**	.253**	.302**
R^2	11.0%	10.4%	7.3%	13.8%
R^2 adjusted	10.3%	9.7%	6.6%	13.2%
F test	16.43**	15.59**	10.61**	21.50**

*** $p < .05$ ** $p < .01$**

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Table 4. Regression Results Across White Males, White Females, and Minorities (Standardized Betas)

	Personal Development			Understanding Science & Technology			Appreciation for Art			Analytical Skills		
Variable	*White Males*	*White Females*	*Minorities*	*White Males*	*White Females*	*Minorities*	*White Males*	*White Females*	*Minorities*	*White Males*	*White Females*	*Minorities*
Precollege Academic Ability												
CAAP scores	-.128*	-.102*	-.132*	.125	-.014	-.061	-.065	.128**	-.131*	.022	.017	-.100
High School GPA	.079	.112*	.089	.037	.044	.270**	.036	-.049	.059	.097	.111**	.121*
Parental Education												
Mother's education	.071	-.007	.004	-.071	-.026	.098	.098	.042	-.057	-.031	-.002	.011
Father's education	.036	.107*	-.034	.123	.010	-.068	.058	.000	.027	.094	.008	.014
Racial Composition of HSchool	.009	.010	.042	.018	-.012	.072	-.031	-.066	.085	.014	.009	-.016
Effort												
Hours spent studying	.065	.029	.031	.134*	.115**	.138**	.074	.019	-.008	.207**	.095*	.075
Cooperative Learning Practices	.275**	.248**	.225**	.224**	.186**	.216**	.190**	.233**	.261**	.204**	.336**	.253**
R^2	11.0%	8.4%	7.5%	11.2%	5.6%	16.1%	7.0%	7.7%	9.1%	12.2%	15.5%	10.0%
R^2 adjusted	9.0%	7.3%	5.4%	9.2%	4.5%	14.2%	4.9%	6.6%	7.1%	10.3%	14.5%	7.9%
F test	5.48**	7.79**	3.51**	5.67**	5.08**	8.43**	3.35**	7.10**	4.43**	6.25**	15.74**	4.83**

*$p < .05$; **$p < .01$

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Table 5. Regression Results for All Students (Standardized Betas)

Variable:	*Openness to Diversity*
Precollege Academic Ability	
CAAP scores	.064*
High School GPA	-.062*
Gender (Female)	-.165**
Parental Education	
Mother's education	.001
Father's education	.030
Racial Composition of HSchool	-.014
Ethnicity	
African-American	-.018
Asian	.038
Hispanic	.084**
Effort	
Hours spent studying	.060*
Cooperative Learning Practices	.235**
R^2	10.1%
R^2 adjusted	9.4%
F test	15.17**

** $p < .05$; ** $p < .01$*

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